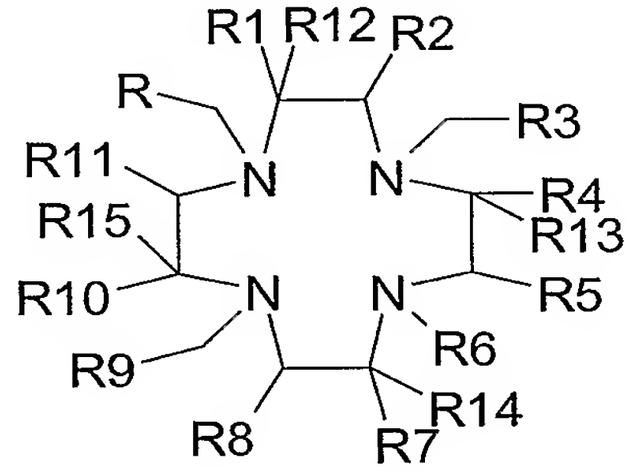
We claim:

1. A compound comprising a polyazamacrocyclic compound and at least one phosphonic group substituted on at least one of the aza groups of said polyazamacrocyclic compound.

2. The compound of claim 1 wherein said polyazamacrocyclic compound comprises the general formula (II):



(II)

where $R^1 = R^2 = R^7 = R^8 = R^{10} = R^{11} = H$;

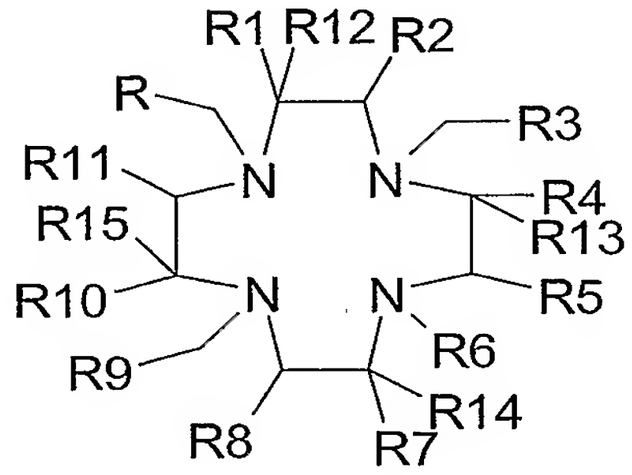
R^{12}, R^{13}, R^{14}, and $R^{15} = CH_3$ or H;

$R^4 = R^5$; and $R^{10} = R^{11}$ can be H or groups taken together forming a cyclic C_3-C_4 alkene group;

at least one of R, R^3, R^6 or $R^9 = X$, where $X = CH_2P(O)(OH)_2$, $CH_2P(O)(OC_4H_9\text{-}t)_2$, $CH_3CH\ P(O)(OH)_2$, $CH\ P(O)(OH)_2$-$(CH_2)_nCO_2H$, $CH\ P(O)(OH)_2$, $(CH_2)_nNH_2$, $CH\ P(O)(OH)_2$-Aryl-CO_2H, $CH\ P(O)(OH)_2$-Aryl-NH_2 or $CHP(O)(OH)_2$-Aryl-NHCS, where n= 1-12; and

when R, R^3, R^6 or R^9 are not X, then that R, R^3, R^6 or R^9 is CO_2 C $(CH)_3$, or CO_2H.

3. The compound of claim 1 wherein said polyazamacrocyclic compound comprises the general formula (III):



(III)

where $R = R^3 = R^9 = CO_2 C (CH)_3$, or CO_2H;

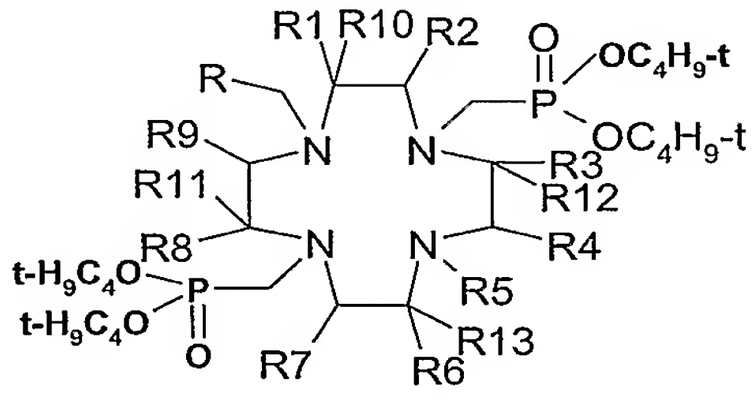
$R^1 = R^2 = R^4 = R^5 = R^7 = R^8 = R^{10} = R^{11} = H$;

R^{12}, R^{13}, R^{14}, and $R^{15} = CH_3$ or H;

$R^{10} = R^{11}$ can be H or groups taken together forming a cyclic C_3-C_4 alkene group; and

$R^6 = CH_2P (O) (OH)_2$, $CH_2P (O) (OC_4H_9\text{-}t)_2$, $CH_3CH P (O) (OH)_2$, CH P (O) $(OH)_2$-$(CH_2)_nCO_2H$, CH P (O) $(OH)_2$, $(CH_2)_nNH_2$, CH P (O) $(OH)_2$-Aryl-CO_2H or CH P (O) $(OH)_2$-Aryl-NH_2, where n = 1-12.

4. The compound of claim 1 wherein said polyazamacrocyclic compound comprises the general formula (IV):



(IV)

where $R^1 = R^2 = R^3 = R^4 = R^6 = R^7 = R^8 = R^9 = H$;

$R^3 = R^4$ and $R^8 = R^9$ can be H or groups taken together forming a cyclic C_3-C_4 alkene group;

R^{10}, R^{11}, R^{12} and $R^{13} = CH_3$ or H;

$R = CO_2C(CH_3)_3$; and

R^5 = $CH_2P(O)(OH)_2$, $CH_2P(O)(OC_4H_9\text{-}t)_2$, $CH_3CH\ P(O)(OH)_2$, CH P (O) $(OH)_2$-(CH_2)nCO_2H, CH P (O) $(OH)_2$, $(CH_2)_nNH_2$, CH P (O) $(OH)_2$-Aryl-CO_2H, CH P (O) $(OH)_2$-Aryl-NH_2 or CH P (O) $(OH)_2$-Aryl-NHCS, where n = 1-12.

5. A compound of the formula:

10-Phosphonomethyl-1,4,7,10-tetraazacyclododecane-1,4,7-triacetic acid (MPDO3A);

10-(1-phosphonoethyl)-1, 4, 7, 10-tetrazacycododecane-1, 4, 7-triacetic acid;

10-[[Bis(1,1-dimethylethoxy)phosphinyl]methyl]-1,4,7,10-tetraazacyclododecane-1,4,7-triacetic acid 1,7-bis(1,1-dimethylethyl)ester;

10-[[Bis(1,1-dimethylethoxy)phosphinyl]methyl]-α'-(carboxymethyl)-1,4,7,10-tetraazacyclododecane-1,4,7-triacetic acid α,α',α''-tris(1,1-dimethylethyl)ester;

10-[[1-[Bis(1,1-dimethylethoxy)phosphinyl]-3-carboxy]propyl]-1,4,7,10-tetraazacyclododecane-1,4,7-triacetic α,α',α''-tris(1,1-dimethylethyl)ester; or

4,10-Bis[[bis(1,1-dimethylethoxy)phosphinyl]methyl]-1,4,7,10-tetraazacyclododecane-1,7-diacetic (1,1-dimethylethyl)ester.

6. A compound comprising a homo dimer, hetero dimer, homo multimer or hetero multimer of the compound of any of claims 1-5.

7. A complex comprising the compound of any of claims 1-5 complexed with a paramagnetic or radionuclide metal.

8. A method for preparing a complex comprising the step of conjugating the compound of any of claims 1-5 with a paramagnetic or radionuclide metal.

9. A method of imaging comprising the steps of:

administering to a patient a diagnostic imaging agent comprising the compound of any of claims 1-5 complexed with a paramagnetic or radionuclide metal, and imaging said patient.

10. A method for preparing a diagnostic imaging agent comprising the step of adding to an injectable medium a substance comprising the compound of any of claims 1-5.

11. A kit for preparing a diagnostic imaging agent comprising the compound of any of claims 1-5.

12. A kit for preparing a radiotherapeutic agent comprising the compound of any of claims 1-5.

13. A method of treating a patient comprising the step of administering to a patient a radiotherapeutic agent comprising the compound of any of claims 1-5 complexed with a therapeutic radionuclide.

14. A method of preparing a radiotherapeutic agent comprising the step of adding to an injectable therapeutic medium a substance comprising at least one compound of any of claims 1-5.

15. The compound of any of claims 1-5 further comprising a linking group.

16. The complex of claim 7 further comprising a linking group.

17. The compound of any of claims 1-5 further comprising a targeting moiety.

18. The complex of claim 7 further comprising a targeting moiety.

19. The compound of any of claims 1-5 further comprising a linking group and a targeting moiety.

20. The complex of claim 7 further comprising a linking group and a targeting moiety.

21. A salt form of the compound of any of claims 1-5.

22. A salt form of the complex of claim 7.

23. A method for preparing a polyazamacrocyclic compound bound to a linker, targeting moiety, diagnostic moiety or therapeutic moiety comprising the step of:

conjugating a polyazamacrocyclic compound to a linker, targeting moiety, diagnostic moiety or therapeutic moiety with a coupling agent, wherein:

said coupling agent is selected from the group consisting of DCC, HOBT and HATU,

said polyazamacrocyclic compound comprises one carboxyl group and/or at least one amino group, and

said linker, targeting moiety, diagnostic moiety or therapeutic moiety comprises at least one amino or acid functional group.